HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, Colorado 80527-2400

PATENT APPLICATION

ATTORNEY DOCKET NO. 200309536-1

**IN THE**
**UNITED STATES PATENT AND TRADEMARK OFFICE**

| | | | |
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| **Inventor(s):** | **Mohammed Shaarawi** | **Confirmation No.:** | **1352** |
| **Application No.:** | **10/734,328** | **Examiner:** | **Brittany L. Raymond** |
| **Filing Date:** | **12/12/2003** | **Group Art Unit:** | **1756** |

**Title: Method for making fluid emitter orifice**

**Mail Stop Appeal Brief-Patents**
**Commissioner For Patents**
**PO Box 1450**
**Alexandria, VA 22313-1450**

## TRANSMITTAL OF APPEAL BRIEF

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on 4/18/2008.

☒ The fee for filing this Appeal Brief is $510.00 (37 CFR 41.20).

☐ No Additional Fee Required.

**(complete (a) or (b) as applicable)**

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

| | | | |
|---|---|---|---|
| ☐ 1st Month $120 | ☐ 2nd Month $460 | ☐ 3rd Month $1050 | ☐ 4th Month $1640 |

☐ The extension fee has already been filed in this application.

☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of $ 510. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees.

Respectfully submitted,

Mohammed Shaarawi

By /Michael Dryja/

Michael Dryja

Attorney/Agent for Applicant(s)

Reg No. : 39,662

Date : 6/18/2008

Telephone : (425) 427-5094

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| First named Applicant: Mohammed Shaarawi<br>Application No.: 10/734,328 (CONF 1352)<br>Filed: 12/12/2003<br>Title: Method for making fluid emitter orifice<br>Attorney Docket No.: 200309536-1 | Group Art Unit:<br>1756<br><br><br><br>Examiner:<br>Brittany L. Raymond |

Assistant Commissioner for Patents
Washington, D.C. 20231

APPEAL BRIEF

This Appeal Brief is organized in accordance with the requirements set forth in 37 CFR 41.37(c).

Real party in interest

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

Related appeals and interferences

There are no related appeals or interferences to the present patent application.

Status of claims

Claims 1 and 3-52 are pending in the patent application, and all stand rejected. The rejection of all the pending claims 1 and 3-52 is being appealed herein, and therefore all the pending claims 1 and 3-52 are subject to this appeal.

Status of amendments

Amendments were made to the claims in the office action response of February 15, 2007, which were then entered by the Examiner in the next office action. As such, there are no non-entered amendments pending to the claims. As to the status of any amendments filed subsequent to the final rejection of the claims, no such amendments were filed.

Summary of claimed subject matter

There are three independent claims, claims 1, 11, and 31, pending in the present patent application.

*Claim 1*

Claim 1 is directed to a method of forming a depression in a surface of a layer of photo-resist (methods of FIGs. 5A and 5C, as described on p. 15, ll. 4-14, para. [0042]). The method exposes a first portion of the layer of photo-resist with a first dose of radiant energy (part 100 of FIG. 5A, p. 15, ll. 6-7, para. [0042]; part 102 of FIG. 5C, p. 15, ll. 12-13, para. [0042]). The method exposes a second portion of the layer of photo-resist with a second dose of radiant energy (part 120 of FIG. 5A, p. 15, l. 8, para. [0042]; part 122 of FIG. 5C, p. 15, ll. 13-14, para. [0042]). The second dose is less than the first dose (p. 10, ll. 8-16, para. [0031]). The method forms the depression at the surface of the layer in the first or second portion of the layer by baking the layer (parts 110 and 130 of FIG. 5A, p. 15, ll. 7-8, para. [0042]; part 132 of FIG. 5C, p. 15, l. 14, para. [0042]; a "PEB" as in parts 110, 130, and 132 is a post-exposure bake, as in p. 7, l. 4, para. [0025], which causes the depression to be formed, as in p. 7, ll. 25-26, para. [0026]).

*Claim 11*

Claim 11 is directed to a method of photo-etching a void in a layer of photo-resist (methods of FIGs. 5A and 5C, as described on p. 15, ll. 4-14, para. [0042]). The method exposes a first portion of a layer of photo-resist with a first dose of radiant energy (part 100 of FIG. 5A,

p. 15, ll. 6-7, para. [0042]; part 102 of FIG. 5C, p. 15, ll. 12-13, para. [0042]). The method exposes a second portion of the layer of photo-resist with a second dose of radiant energy (part 120 of FIG. 5A, p. 15, l. 8, para. [0042]; part 122 of FIG. 5C, p. 15, ll. 13-14, para. [0042]). The second dose is less than the first dose (p. 10, ll. 8-16, para. [0031]). The method leaves a third portion of the layer of photo-resist unexposed to the radiant energy (p. 6, ll. 1-3, para. [0023]; p. 9, l. 22 through p. 10, l. 1, para. [0030]). The method forms a depression at the surface of the layer in the first or section portion of the layer by baking the layer (parts 110 and 130 of FIG. 5A, p. 15, ll. 7-8, para. [0042]; part 132 of FIG. 5C, p. 15, l. 14, para. [0042]; a "PEB" as in parts 110, 130, and 132 is a post-exposure bake, as in p. 7, l. 4, para. [0025], which causes the depression to be formed, as in p. 7, ll. 25-26, para. [0026]).

The method develops the layer of photo-resist (part 140 of FIG. 5A, p. 15, ll. 8-9, para. [0042]; part 142 of FIG. 5C, p. 15, l. 14, para. [0042]). Developing the layer of photo-resist forms a void in the layer (p. 11, ll. 7-12, para. [0033]). The void extends through the layer of photo-resist in the third portion of the layer (in FIG. 2E, the void 2 extends through the layer of photo-resist within the portion of the layer that is identified by 11' in FIG. 2C, which is an unexposed portion as noted on p. 9, ll. 22 through p. 10, l. 1, para. [0030]). The void is within the depression in the surface of the layer in the second portion (in FIG. 2E, the void 2 is within the depression that is identified by 15' in FIG. 2D, as noted on p. 11, ll. 2-4, para. [0032]).

*Claim 31*

Claim 31 is directed to a method for forming a fluid emitter nozzle (methods of FIGs. 5A and 5C, as described on p. 15, ll. 4-14, para. [0042]). The method exposes a first portion of the photo-resist with a first dose of radiant energy (part 100 of FIG. 5A, p. 15, ll. 6-7, para. [0042]; part 102 of FIG. 5C, p. 15, ll. 12-13, para. [0042]). The method exposes a second portion of the layer of photo-resist with a second dose of radiant energy (part 120 of FIG. 5A, p. 15, l. 8, para. [0042]; part 122 of FIG. 5C, p. 15, ll. 13-14, para. [0042]). The second dose is less than the first dose (p. 10, ll. 8-16, para. [0031]). The method leaves a nozzle portion of the layer of photo-

resist unexposed to the radiant energy (p. 6, ll. 1-3, para. [0023]; p. 9, l. 22 through p. 10, l. 1, para. [0030]). The method forms a depression at the surface of the layer in the first or second portion of the layer by baking the layer(parts 110 and 130 of FIG. 5A, p. 15, ll. 7-8, para. [0042]; part 132 of FIG. 5C, p. 15, l. 14, para. [0042]; a "PEB" as in parts 110, 130, and 132 is a post-exposure bake, as in p. 7, l. 4, para. [0025], which causes the depression to be formed, as in p. 7, ll. 25-26, para. [0026]).

The method develops the layer of photo-resist (part 140 of FIG. 5A, p. 15, ll. 8-9, para. [0042]; part 142 of FIG. 5C, p. 15, l. 14, para. [0042]). Developing the layer of photo-resist forms a nozzle in the layer and a counter bore at the surface of the layer in the second portion (the void noted in p. 11, ll. 7-12, para. [0033] may be a nozzle as noted in p. 4, ll. 16-17, para. [0020]; the depression that is identified by 15' in FIG. 2D as noted on p. 11, ll. 2-4, para. [0032] may be a counter bore as noted in p. 4, ll. 20-21, para. [0020]). The second portion has a first diameter at the surface and a second diameter where the nozzle meets the second portion, where the first diameter is greater than the second diameter (in FIG. 2E, is it evident that the diameter of the counter-bore/depression at the top surface, as indicated by reference number 21, is greater than the diameter of the counter-bore/depression where the void/nozzle 2 is).

Grounds of rejection to be reviewed on appeal

For the purposes of this appeal, there is one ground of rejection to be reviewed on appeal: whether the pending claims 1 and 3-52 are properly rejected under 35 USC 103. Claims 1, 4, and 6, 11-12, 16, 21-24, and 29 have been rejected under 35 USC 103(a) as being unpatentable over Tzu (6,007,324) in view of Tashiro (2004/0257506).[1] Claims 3, 5, 25-28, and 30 have been rejected under 35 USC 103(a) as being unpatentable over Tzu in view of Tashiro, and further in

[1] In the final office action of January 10, 2008, the Examiner did not actually recite claim 4 in the detailed action section of the office action as being rejected over Tzu in view of Tashiro, but Applicant presumes that this was simply an oversight on the part of the Examiner.

view of Cauchi (2004/0101790). Claims 7-10, 17-20, 37-40, and 49-51 have been rejected under 35 USC 103(a) as being unpatentable over Tzu, Tashiro, Okoroanyanwu (6,589,713), and Cauchi. Claims 13-15 have been rejected under 35 USC 103(a) as being unpatentable over Tzu in view of Tashiro, and further in view of Okoroanyanwu. Claims 31-36, 41-48, and 52 have been rejected under 35 USC 103(a) as being unpatentable over Tzu in view of Tashiro, Okoroanyanwu, and Cauchi, and further in view of Makigaki (6,863,375).[2]

Argument

Applicant's argument is that Tzu is not properly modified particularly in view of Tashiro, and for this reason all the pending claims are not obvious and unpatentable under 35 USC 103 over Tzu in view of Tashiro alone, or over Tzu in view of Tashiro and in further view of one or more other prior art references. All the pending claims have been rejected under 35 USC 103 over Tzu in view of Tashiro alone, or over Tzu in view of Tashiro and in further view of one or more other prior art references. Therefore, inasmuch as Tzu is not properly modified in view of or combined with Tashiro in particular, there is no *prima facie* obviousness under 35 USC 103 as to all the pending claims.

Applicant specifically contends that Tzu teaches away from being modified per Tashiro as suggested by the Examiner. The Supreme Court in its recent decision, KSR Int'l Co. v. Teleflex, Inc., 550 US _____ (2007), stated that it "when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious." (KSR, at p. 12; see also In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983)) One type of teaching away is that "[t]he proposed modification cannot render

[2] Applicant notes that claims 37-40 and 49-51 should have also been rejected over Tzu in view of Tashiro, Okoroanyanwu, Cauchi, and Makigaki, because these claims ultimately depend from independent claim 31, which itself was rejected over Tzu in view of Tashiro, Okoroanyanwu, Cauchi, and Makigaki. However, this error has no effect on the argument made below.

the prior art unsatisfactory for its intended purpose." (In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984))

Tzu is directed to a "double layer method for fabricating a rim type attenuating phase shifting mask." (Title) Tzu more specifically states the following:

> This invention describes methods of forming *rim type attenuating phase shifting masks* using a single resist layer and a single developing solution.
>
> . . . .
>
> . . . . Rim type attenuating phase shifting masks are used to overcome the problems of the side lobe effect and retain the advantages of attenuating phase shifting masks. In rim type attenuating phase shifting masks a mask pattern is defined using attenuating phase shifting material. A second pattern of opaque material is then formed over the attenuating phase shifting material leaving *a gap width* of attenuating phase shifting material which is not covered by the opaque material. The attenuating phase shifting material defines the pattern and the opaque material *prevents the problems of side lobe effect from occurring*.
>
> . . . .
>
> *It is a principle objective of this invention to provide a method for forming rim type masks* . . . .
>
> . . . .
>
> A first pattern is formed in a layer of attenuating phase shifting material 12 . . . . A second pattern is formed in a layer of opaque material 14 . . . . The second pattern in the opaque material 14 forms a rim at the pattern edge of the first pattern leaving a gap width 16 of attenuating phase shifting material 12 exposed. *Gap widths of between about 0.1 and 0.4 micrometers have been shown to eliminate the side lobe problem* with a gap width of about 0.4 micrometer giving the best image resolution for a 0.35 micrometer contact hole using an i-line stepper.

(Col. 2, ll. 10-62; col. 3, ll. 31-45.)

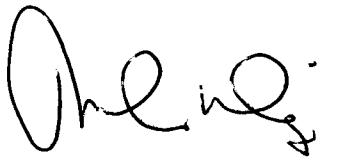
Thus, it is abundantly fair to say that the purpose of Tzu is to fabricate a rim type attenuating phase shifting mask. Such a mask works by defining a rim within the layer 14 around the via within the layer 12, as depicted in FIG. 2 of Tzu. The critical feature in Tzu is the gap 16 between the rim and the via in FIG. 2. In particular, as noted above, where the width of this gap is between 0.1 and 0.4 micrometers, side lobe effect problems are eliminated. In FIGs. 3-14, Tzu depicts a process for fabricating such a rim type attenuating phase shifting mask, including

exposing the photoresist 18 to two different dosages over two different portions 20 and 22 of the photoresist 18 in FIG. 4, and thereafter developing the photoresist 18 so that, as depicted in FIG. 5, there is a pattern within the photoresist 18 that corresponds to the rim type attenuating phase shifting mask. Although not called out in FIG. 5 of Tzu, the gap 16 is clearly depicted in FIG. 5 within the photoresist 18 itself (i.e., the gap 16 being the portion 22 that is not overlapped by the portion 20).

Now, the Examiner would modify Tzu in view of Tashiro to bake the photoresist 18 after FIG. 4 of Tzu, instead of developing the photoresist 18 as in FIG. 5 of Tzu. However, modifying Tzu in view of Tashiro as suggested by the Examiner would mean that the resulting combination could no longer be used to fabricate a rim type attenuating phase shifting mask. Instead of having a clearly defined, sharp-edged pattern within the photoresist 18 where there is a gap 16, as in FIG. 5 of Tzu, instead the resulting combination would have a depression due to the baking of Tashiro. The critical feature of Tzu – the gap 16 – would "melt" or "soften" (i.e., become "depressed") along with the rest of the photoresist 18 exposed to the radiation, making the gap 16 much less clearly defined, if at all. It would become very difficult at best to control the width of the gap 16, which is the critical measurement needed to prevent side lobe problems. The depression within the photoresist 18 that results from modifying Tzu in view of Tashiro is unlikely to be able to be used to fabricate a rim type attenuating phase shifting mask, which is the sole purpose of Tzu in the first place.

In this way, modifying Tzu in view of Tashiro is a "proposed modification [that] render[s] the prior art unsatisfactory for its intended purpose," in contradistinction to the Federal Circuit's statement in Gordon. Thus, "when the prior art [so] teaches away from combining certain known elements," the invention in question "is more likely to be nonobvious," to quote the Supreme Court in KSR. Therefore, the claimed invention is not *prima facie* obvious over Tzu in view of Tashiro for this reason.

Respectfully Submitted,



June 18, 2008
Date

Michael Dryja, Reg. No. 39,662
Attorney/Agent for Applicant(s)

Michael Dryja, Esq.
Law Offices of Michael Dryja
1474 N Cooper Rd #105-248
Gilbert, AZ 85233

tel: 425-427-5094
fax: 425-563-2098

Claims appendix

1. (previously presented) A method of forming a depression in a surface of a layer of photo-resist, comprising:

exposing a first portion of the layer of photo-resist with a first dose of radiant energy;

exposing a second portion of the layer of photo-resist with a second dose of radiant energy, the second dose being less than the first dose; and

forming the depression at the surface of the layer in the first or second portion of the layer by baking the layer.

2. (cancelled)

3. (original) The method of Claim 1, wherein said baking the layer comprises baking the layer at a temperature in a range from 80 to 120 degrees Celsius.

4. (original) The method of Claim 1, wherein said baking the layer occurs after exposing the second portion of the layer of photo-resist with a second dose of radiant energy.

5. (original) The method of Claim 1, wherein said baking the layer comprises:

baking the layer after exposing the layer through a first mask and before exposing the layer through a second mask; and

subsequently baking the layer after exposing the layer through a second mask.

6. (original) The method of Claim 1 wherein:

said exposing the first portion of the layer of photo-resist with the first dose of radiation comprises exposing the layer through a first mask, the first mask having a transmissive portion corresponding to the first portion of the layer and a non-transmissive portion corresponding to the

second portion and a third portion of the layer, and exposing the layer through a second mask, the second mask having a transmissive portion corresponding to the first portion and the second portion and a non-transmissive portion corresponding to the third portion; and

wherein said exposing the second portion of the layer of photo-resist to the second dose comprises exposing the layer through the second mask.

7. (original) The method of Claim 6, wherein said exposing the layer through the first mask comprises exposing the layer with a dose in a range of about 75-300 mJoules/cm2.

8. (original) The method of Claim 6, wherein said exposing the layer through the first mask comprises exposing the layer with a dose of about 100 mJoules/cm2.

9. (original) The method of Claim 6, wherein said exposing the layer through the second mask comprises exposing the layer with a dose in a range of about 600-2000mJoules/cm2.

10. (original) The method of Claim 6, wherein said exposing the layer through the second mask comprises exposing the layer with a dose of about 1000 mJoules/cm2.

11. (previously presented) A method of photo-etching a void in a layer of photo-resist, comprising:

exposing a first portion of a layer of photo-resist with a first dose of radiant energy;

exposing a second portion of the layer of photo-resist with a second dose of radiant energy, the second dose being less than the first dose;

leaving a third portion of the layer of photo-resist unexposed to the radiant energy;

forming a depression at the surface of the layer in the first or second portion of the layer by baking the layer; and

developing the layer of photo-resist, thereby forming a void in the layer, the void extending through the layer of photo-resist in the third portion of the layer,

wherein the void is within the depression in the surface of the layer in the second portion.

12. (original) The method of Claim 11, wherein the third portion is enclosed within the second portion.

13. (original) The method of Claim 11, wherein the void comprises a lower portion with a substantially circular cross-section, wherein the depression has a substantially circular cross-section, and wherein a circumference of the lower portion of the void lies within a circumference of the depression at the surface.

14. (original) The method of Claim 11, wherein the depression has a generally parabolic shape.

15. (original) The method of Claim 13, wherein the lower portion and the depression are substantially concentric.

16. (original) The method of Claim 11 wherein:

said exposing the first portion of the layer of photo-resist with the first dose of radiation comprises exposing the layer through a first mask, the first mask having a transmissive portion corresponding to the first portion of the layer and a non-transmissive portion corresponding to the second and third portions of the layer, and exposing the layer through a second mask, the second mask having a transmissive portion corresponding to the first portion and the second portion and a non-transmissive portion corresponding to the third portion; and

wherein said exposing the second portion of the layer of photo-resist to the second dose comprises exposing the layer through the second mask.

17. (original) The method of Claim 16, wherein said exposing the layer through the first mask comprises exposing the layer with a dose in a range of about 75-300 mJoules/cm2.

18. (original) The method of Claim 16, wherein said exposing the layer through the first mask comprises exposing the layer with a dose of about 100 mJoules/cm2.

19. (original) The method of Claim 16, wherein said exposing the layer through the second mask comprises exposing the layer with a dose in a range of about 600-2000mJoules/cm2.

20. (original) The method of Claim 16, wherein said exposing the layer through the second mask comprises exposing the layer with a dose of about 1000 mJoules/cm2.

21. (original) The method of Claim 16, wherein said exposing the layer through the first mask occurs before exposing the layer through the second mask.

22. (original) The method of Claim 16, wherein said exposing the layer through the second mask occurs before exposing the layer through the first mask.

23. (original) The method of Claim 21, wherein said baking the layer occurs after exposing the layer through the second mask.

24. (original) The method of Claim 22, wherein said baking the layer occurs after exposing the layer through the first mask.

25. (original) The method of Claim 16, wherein said baking the layer occurs after exposing the layer through the first mask and after exposing the layer through the second mask.

26. (original) The method of Claim 16, wherein said baking the layer comprises a first baking of the layer after exposing the layer through the first mask and before exposing the layer through the second mask and a second baking of the layer after exposing the layer through the second mask.

27. (original) The method of Claim 11 wherein said baking the layer comprises baking the layer at a temperature within a range from 80 to 120 degrees Celsius.

28. (original) The method of Claim 11 wherein said baking the layer comprises baking the layer for up to about 5 minutes.

29. (original) The method of Claim 11 wherein:

exposing the first portion of the layer to a first dose comprises exposing the layer through a mask having a transmissive portion corresponding to the first portion of the layer;

exposing the second portion of the layer comprises exposing the layer through the mask, the mask also having a partially transmissive portion corresponding to the second portion of the layer;

and wherein leaving the third portion of the layer of photo-resist unexposed to the radiant energy comprises exposing the layer through the mask, the mask also having a non-transmissive portion corresponding to the third portion of the layer.

30. (original) The method of Claim 11, wherein the photo-resist is a negative photo-resist.

31. (previously presented) A method for forming a fluid emitter nozzle comprising:

providing an layer of photo-resist over a surface of a barrier layer;

exposing a first portion of the photo-resist with a first dose of radiant energy;

exposing a second portion of the layer of photo-resist with a second dose of radiant energy, the second dose being less than the first dose;

leaving a nozzle portion of the layer of photo-resist unexposed to the radiant energy;

forming a depression at the surface of the layer in the first or second portion of the layer by baking the layer; and

developing the layer of photo-resist, thereby forming a nozzle in the nozzle portion and a counter bore at the surface of the layer in the second portion, the second portion having a first diameter at the surface and a second diameter where the nozzle meets the second portion, the first diameter being greater than the second diameter.

32. (original) The method of Claim 31, wherein the nozzle portion is enclosed within the second portion.

33. (original) The method of Claim 31, wherein the nozzle and the second portion have substantially circular cross-sections.

34. (original) The method of Claim 33, wherein the circumference of the lower portion of the void lies within the circumference of the depression at the surface.

35. (original) The method of Claim 34, wherein the nozzle portion and the second portion are substantially concentric.

36. (original) The method of Claim 31 wherein:

said exposing the first portion of the photo-resist with a first dose of radiant energy comprises exposing the layer through a first mask, the first mask having a transmissive portion corresponding to the first portion and a non-transmissive portion corresponding to the second

portion and the nozzle portion, and exposing the layer through a second mask, the second mask having a transmissive portion corresponding to the first portion and the second portion;

said exposing the second portion of the layer of photo-resist with a second dose of radiant energy comprises the exposing of the layer through the second mask.

37. (original) The method of Claim 36, wherein said exposing the layer through the first mask comprises exposing the layer with a dose in a range of about 75-300 mJoules/cm2.

38. (original) The method of Claim 36, wherein said exposing the layer through the first mask comprises exposing the layer with a dose of about 100 mJoules/cm2.

39. (original) The method of Claim 36, wherein said exposing the layer through the second mask comprises exposing the layer with a dose in a range of about 600-2000mJoules/cm2.

40. (original) The method of Claim 36, wherein said exposing the layer through the second mask comprises exposing the layer with a dose of about 1000 mJoules/cm2.

41. (original) The method of Claim 36, wherein said exposing the layer through the first mask occurs before exposing the layer through the second mask.

42. (original) The method of Claim 36, wherein said exposing the layer through the second mask occurs before exposing the layer through the first mask.

43. (original) The method of Claim 41, wherein said baking the layer occurs after exposing the layer through the second mask.

44. (original) The method of Claim 42, wherein said baking the layer occurs after exposing the layer through the first mask.

45. (original) The method of Claim 36, wherein said baking the layer occurs after exposing the layer through the first mask and after exposing the layer through the second mask.

46. (original) The method of Claim 36, wherein said baking the layer comprises a first baking of the layer after exposing the layer through the first mask and before exposing the layer through the second mask and a second baking of the layer after exposing the layer through the second mask.

47. (original) The method of Claim 31, wherein said baking the layer comprises baking the layer at a temperature within a range from 80 to 120 degrees Celsius.

48. (original) The method of Claim 31, wherein said baking the layer comprises baking the layer for up to about five minutes.

49. (original) The method of Claim 31, wherein the first diameter is in a range of about 20um to 40 um.

50. (original) The method of Claim 31, wherein the second diameter is in a range of about 8um-20um.

51. (original) The method of Claim 31, wherein the second portion has a depth in a range of about -0.1um to 3.5 um.

52. (original) The method of Claim 31 wherein:

said exposing the first portion of the photo-resist with the first dose of radiant energy comprises exposing the layer through a mask, the mask comprising a transmissive portion corresponding to the first portion, a partially transmissive portion corresponding to the second portion and a non-transmissive portion corresponding to the nozzle portion; and

said exposing the second portion with the second dose of radiant energy comprises the exposing the layer through the mask.

53.-54. (withdrawn)

Evidence Appendix

(No evidence was submitted pursuant to Rules 130, 131, and 132, and therefore, this section is blank.)

Related Proceedings Appendix

(There are no related proceedings to this patent application, and therefore, this section is blank.)